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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,717	08/20/2001	Hideaki Ninomiya	0756-2350	4618

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EXAMINER
GEYER, SCOTT B

ART UNIT	PAPER NUMBER
2829	

DATE MAILED: 04/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/931,717	NINOMIYA ET AL.	
	Examiner	Art Unit	
	Scott Geyer	2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- if NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 August 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. Figures 1A, 1B, 1C, 2A, 2B, 3, 4A and 4B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description:

Figure 2A: numerals 202 and 203;

Figure 2B: numerals 203 and 205;

Figure 3: numeral 306;

Figure 4A: numerals 401 and 403;

Figure 4B: numerals 404 and 405;

Figure 5A: numeral 501;

Figure 6: numerals 601, 602, 603 and 604;

Figure 7: numerals 701, 702, 703, 704 and 705.

A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the

Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to because numeral 502 is not shown in figure 5B, as noted in the specification on page 8, lines 2-3. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The disclosure is objected to because of the following informalities:

Page 1, line 7: change "alignemnt" to - - alignment - -;

Page 2, lines 21 and 22: re-word sentence for clarification ("Also, since the film…jig and carry it.");

Page 3, line 9: change "uniformed" to - - uniform - -;

Page 6, line 13: change "defective" to - - defect - -;

Page 7, line 8: change "particularly a" to - - a particularly - -;

Page 7, line 9: re-word for clarification ("and thus the substrate is not almost deformed");

Page 8, lines 13-15: re-word sentence for clarification ("Actually, a temperature…several tens degrees.");

Page 8, line 22: define relevance of sentence ("Thus, a flat surface…a wooden frame.");

Page 9, line 13: change "of typical" to - - of the typical - -;

Page 10, lines 6-9: re-word sentence for clarification ("When the holding…process until now.").

Appropriate correction is required.

6. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware of in the specification.

7. The examiner advises applicant that in future applications, line numbers for every page of the specification would be helpful in assisting the examiner address the specification for any correction of errors.

Claim Objections

8. Claims 4, 6, 16, 18, 20, 22, 24 and 26 are objected to because of the following informalities: change "comprises ceramics-metal complex" to - - comprises a ceramics-metal complex - -. Appropriate correction is required.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1, 2, 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) in view of Hirano et al. (5,561,321).

As to claim 1, Sakurai et al. teach a holding frame which securely holds a pellicle by an adhesive ring on the edge of the frame (column 2, lines 25 et seq.) The pellicle is a flexible substrate. The frame can be made of aluminum, stainless steel, plastics, ceramics and the like (column 8, lines 19-24).

Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 10 ppm/°C.

However, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) **Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233**. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite. Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step.

As to claim 2, Sakurai et al. teach attaching the substrate to the outer circumference of the frame (see figure 1b, numeral 3).

As to identical claims 4 and 6, Hirano et al. teach a ceramics-metal complex (column 2, lines 27 et seq.).

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11. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) and Hirano et al. (5,561,321) as applied to claims 1 and 2 above, respectively, and further in view of Hosaki et al. (6,210,872).

As to identical claims 3 and 5, neither Sakurai et al. nor Hirano et al. teach a flexible substrate comprised of polyethylene naphthalate, polyethylene terephthalate, polyether sulfone or polyimide.

However, Hosaki et al. teach substrates made of polyimides, polyether sulfones, polyethylene terephthalate and polyethylene naphthalate (column 48, lines 47 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. and Hirano et al. with various polymer compounds for making a thin film substrate as taught by Hosaki et al. The polymer chosen for the substrate would depend upon the desired characteristics and properties of the film in relation to its end use. Such characteristics could be, for example, thermal stability and transparency.

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12. Claims 7, 8, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) in view of Hirano et al. (5,561,321).

As to claim 7, Sakurai et al. teach a holding frame which securely holds a pellicle by an adhesive ring on the edge of the frame (column 2, lines 25 et seq.) The pellicle is

a flexible substrate. The frame can be made of aluminum, stainless steel, plastics, ceramics and the like (column 8, lines 19-24).

Sakurai et al. do not teach thermal shrinkage of the flexible substrate. However, Sakurai et al. do teach heating of the flexible substrate (column 7, lines 15-29). **Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal shrinkage, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233**. The skilled artisan would find obvious that modifying the heating temperature which the flexible substrate is exposed to would result in overall shrinkage of the substrate. The extent to which the substrate would shrink would be a function of the temperature and the time of exposure of heat.

Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 10 ppm/°C.

However, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) **Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a**

result-effective variable involves only routine skill in the art. ***In re Aller*****, 105 USPQ 233**. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite.

Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step.

As to claim 8, Sakurai et al. teach attaching the substrate to the outer circumference of the frame (see figure 1b, numeral 3).

As to identical claims 16 and 18, Hirano et al. teach a ceramics-metal complex (column 2, lines 27 et seq.).

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13. Claims 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) and Hirano et al. (5,561,321) as applied to claims 7 and 8 above, respectively, and further in view of Hosaki et al. (6,210,872).

As to identical claims 15 and 17, neither Sakurai et al. nor Hirano et al. teach a flexible substrate comprised of polyethylene naphthalate, polyethylene terephthalate, polyether sulfone or polyimide.

However, Hosaki et al. teach substrates made of polyimides, polyether sulfones, polyethylene terephthalate and polyethylene naphthalate (column 48, lines 47 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. and Hirano et al. with various polymer compounds for making a thin film substrate as taught by Hosaki et al. The polymer chosen for the substrate would depend upon the desired characteristics and properties of the film in relation to its end use. Such characteristics could be, for example, thermal stability and transparency.

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14. Claims 9, 10, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) in view of Hirano et al. (5,561,321) and Hosokawa (5,192,991).

As to claim 9, Sakurai et al. teach a holding frame which securely holds a pellicle by an adhesive ring on the edge of the frame (column 2, lines 25 et seq.) The pellicle is a flexible substrate. The frame can be made of aluminum, stainless steel, plastics, ceramics and the like (column 8, lines 19-24).

Sakurai et al. do not teach thermal shrinkage of the flexible substrate. However, Sakurai et al. do teach heating of the flexible substrate (column 7, lines 15-29). **Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal shrinkage, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art.** ***In re Aller*****, 105 USPQ 233**. The skilled artisan would find obvious that modifying

the heating temperature which the flexible substrate is exposed to would result in overall shrinkage of the substrate. The extent to which the substrate would shrink would be a function of the temperature and the time of exposure of heat.

Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 10 ppm/°C nor do they teach a conductive film formed on a substrate by sputtering.

However, Hosokawa teaches forming a conductive electrode film by sputtering (column 2, lines 43-44).

Further, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) **Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233**. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite.

Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal

expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step. It would further have been obvious to apply a coating of conductive film by sputtering on the substrate as taught by Hosokawa to provide an electrical connection layer to the polymer substrate layer. As taught by Hosokawa, the conductive film serves as an electrode, a crucial part of a semiconductor device for operation and sputtering is a process well known in the art for applying even layered coatings of extremely thin dimensions.

As to claim 10, Sakurai et al. teach attaching the substrate to the outer circumference of the frame (see figure 1b, numeral 3). Further, Hosokawa teaches an amorphous semiconductor layer applied by plasma CVD (column 2, lines 46-48).

As to identical claims 20 and 22, Hirano et al. teach a ceramics-metal complex (column 2, lines 27 et seq.).

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15. Claims 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549), Hirano et al. (5,561,321) and Hosokawa (5,192,991) as applied to claims 9 and 10 above, respectively, and further in view of Hosaki et al. (6,210,872).

As to identical claims 19 and 21, neither Sakurai et al., Hirano et al. nor Hosokawa teach a flexible substrate comprised of polyethylene naphthalate, polyethylene terephthalate, polyether sulfone or polyimide.

However, Hosaki et al. teach substrates made of polyimides, polyether sulfones, polyethylene terephthalate and polyethylene naphthalate (column 48, lines 47 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al., Hirano et al. and Hosokawa with various polymer compounds for making a thin film substrate as taught by Hosaki et al. The polymer chosen for the substrate would depend upon the desired characteristics and properties of the film in relation to its end use. Such characteristics could be, for example, thermal stability and transparency.

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16. Claims 11, 12, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549) in view of Hirano et al. (5,561,321) and Nakata et al. (6,074,893).

As to claim 11, Sakurai et al. teach a holding frame which securely holds a pellicle by an adhesive ring on the edge of the frame (column 2, lines 25 et seq.) The pellicle is a flexible substrate. The frame can be made of aluminum, stainless steel, plastics, ceramics and the like (column 8, lines 19-24).

Sakurai et al. do not teach thermal shrinkage of the flexible substrate. However, Sakurai et al. do teach heating of the flexible substrate (column 7, lines 15-29). **Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal shrinkage, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable rang s for a result-effective variable involves only routine skill in th art.** ***In re All r*****, 105 USPQ 233**. The skilled artisan would find obvious that modifying

the heating temperature which the flexible substrate is exposed to would result in overall shrinkage of the substrate. The extent to which the substrate would shrink would be a function of the temperature and the time of exposure of heat.

Sakurai et al. do not teach a frame with a thermal expansion coefficient less than 10 ppm/°C nor do they teach forming a predetermined pattern over the substrate by screen printing.

However, Nakata et al. teach forming a predetermined pattern of bumps over a substrate by screen printing (column 5, lines 64 et seq., continued to column 6, lines 1-33).

Further, Hirano et al. teach ceramic-metal composite structures with a variety of thermal expansion coefficients. Hirano et al. does not teach the instant thermal expansion coefficient. However, Hirano et al. specifically teaches that the thermal expansion coefficient will change depending on the ratio of substances within the composite. (column 2, lines 43 et seq.) **Thus, the skilled artisan would find obvious to employ without undue experimentation the instant thermal expansion coefficients, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges for a result-effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233**. The skilled artisan would find obvious that modifying the ratio of substances within the composite material would change the thermal expansion coefficient of the composite.

Therefore, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al. with a composite structure of Hirano et al. to achieve the desired properties of a frame which has a thermal expansion coefficient of such low value that will not disrupt the film substrate attached during a heating step. It would further have been obvious to form a predetermined pattern on a substrate by screen printing as taught by Nakata et al. to provide a pattern of bumps for further connection of the substrate a chip or another substrate, as is common in the art. Screen printing is well known in the art as an efficient process for applying layers of various materials including, but not limited to bump electrodes, solder paste and adhesives.

As to claim 12, Sakurai et al. teach attaching the substrate to the outer circumference of the frame (see figure 1b, numeral 3). Further, Nakata et al. teach laser processing as a means to form a predetermined pattern, for example grooves, on a substrate (column 18, lines 23-31).

As to identical claims 24 and 26, Hirano et al. teach a ceramics-metal complex (column 2, lines 27 et seq.).

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17. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549), Hirano et al. (5,561,321) and Nakata et al. (6,074,893) as applied to claims 11 and 12 above, respectively, and further in view of Sheppard et al. (6,111,324).

As to identical claims 13 and 14, neither Sakurai et al., Hirano et al. nor Nakata et al. teach aligning the substrate by alignment means of the holding frame.

However, Sheppard et al. teach a frame having alignment and index holes for processing of substrates in a semiconductor manufacturing environment (column 1, lines 55-63).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al., Hirano et al. and Nakata et al. with a means to align the substrate during processing as taught by Sheppard et al. It would be necessary to accurately align the substrate for proper placement of successive layers, patterning of grooves, etching or any various processing steps needed to complete the semiconductor device.

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18. Claims 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (6,350,549), Hirano et al. (5,561,321) and Nakata et al. (6,074,893) as applied to claims 11 and 12 above, respectively, and further in view of Hosaki et al. (6,210,872).

As to identical claims 23 and 25, neither Sakurai et al., Hirano et al. nor Nakata et al. teach a flexible substrate comprised of polyethylene naphthalate, polyethylene terephthalate, polyether sulfone or polyimide.

However, Hosaki et al. teach substrates made of polyimides, polyether sulfones, polyethylene terephthalate and polyethylene naphthalate (column 48, lines 47 et seq.).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method of Sakurai et al., Hirano et al. and Nakata et al. with various polymer compounds for making a thin film substrate as taught by Hosaki et al. The polymer chosen for the substrate would depend upon the desired characteristics and properties of the film in relation to its end use. Such characteristics could be, for example, thermal stability and transparency.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Geyer whose telephone number is (703) 306-5866. The examiner can normally be reached on weekdays, between 10:00am - 6:30pm. The examiner may also be reached via e-mail: **scott.geyer@uspto.gov**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (703) 308-1680. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

4-8-02

MICHAEL J. SHERRY
PRIMARY EXAMINER

sbg
April 5, 2002